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# **Industrial Maintenance Mechanics**

Code: 2074 / Version: 01  
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## General Assessment Information

### Blueprint Contents

General Assessment Information	Sample Written Items
Written Assessment Information	Performance Assessment Information
Specific Competencies Covered in the Test	Sample Performance Job

**Test Type:** The Industrial Maintenance Mechanics industry-based credential is included in NOCTI's Job Ready assessment battery. Job Ready assessments measure technical skills at the occupational level and include items which gauge factual and theoretical knowledge. Job Ready assessments typically offer both a written and performance component and can be used at the secondary and post-secondary levels. Job Ready assessments can be delivered in an online or paper/pencil format.

**Revision Team:** The assessment content is based on input from secondary, post-secondary, and business/industry representatives from the states of Arizona, Kentucky, and Michigan.



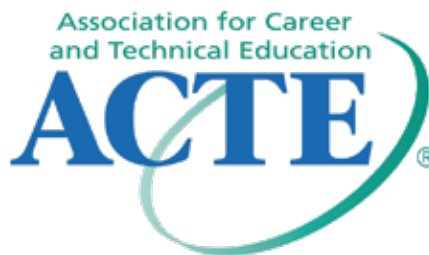
47.0303- Industrial Mechanics and  
Maintenance Technology



Career Cluster 2 -  
Architecture and Construction



49-9041.00- Industrial  
Machinery Mechanics



The Association for Career and Technical Education (ACTE), the leading professional organization for career and technical educators, commends all students who participate in career and technical education programs and choose to validate their educational attainment through rigorous technical assessments. In taking this assessment you demonstrate to your school, your parents and guardians, your future employers and yourself that you understand the concepts and knowledge needed to succeed in the workplace. Good Luck!



NATIONAL COLLEGE CREDIT RECOMMENDATION SERVICE  
University of the State of New York - Regents Research Fund

In the lower division  
baccalaureate/associate degree  
category, 3 semester hours in  
Industrial Maintenance  
Mechanics

## Written Assessment

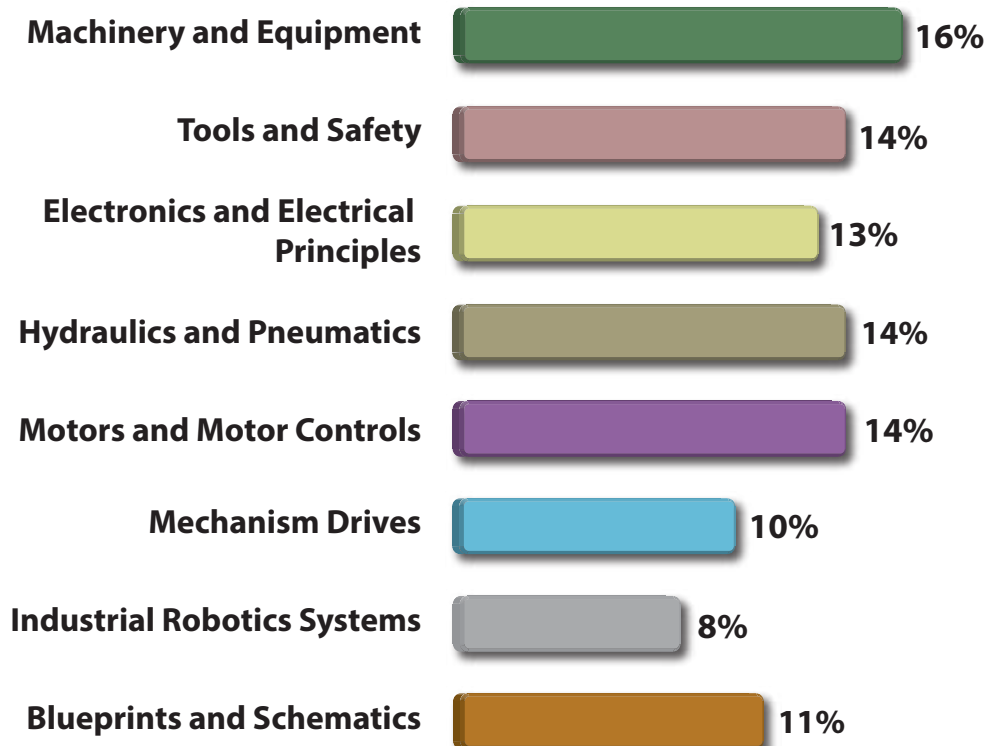
NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

**Administration Time:** 3 hours

**Number of Questions:** 169

**Number of Sessions:** This assessment may be administered in one, two, or three sessions.

### Areas Covered



## Specific Standards and Competencies Included in this Assessment

### **Machinery and Equipment**

- Disassemble, repair, and reassemble machinery/equipment
- Maintain operating condition and perform preventive maintenance of the machinery/equipment
- Identify and troubleshoot component defects and malfunctions
- Test operation of newly repaired machinery/equipment
- Analyze test results, machine error messages, and information from operators in order to diagnose machinery/equipment problems
- Maintain record of repairs and maintenance performed

### **Tools and Safety**

- Select and differentiate appropriate use of various hand tools
- Demonstrate appropriate care of hand tools
- Identify and safely use large machine tools, including lathes, mills, hoists, rigging equipment, and presses
- Identify safe use of ladders and scaffolding
- Demonstrate understanding of lock-out/tag-out procedures
- Exhibit understanding of shop safety

### **Electronics and Electrical Principles**

- Apply basic electrical principles
- Demonstrate knowledge of basic CNC operations
- Demonstrate knowledge of basic programmable logic controllers (PLCs)
- Exhibit basic knowledge of electrical symbols

### **Hydraulics and Pneumatics**

- Interpret basic hydraulic and pneumatic symbols
- Apply knowledge of hydraulic and pneumatic components
- Interpret hydraulic and pneumatic principles

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## Specific Standards and Competencies (continued)

### Motors and Motor Controls

- Apply basic electrical principles of motors
- Interpret appropriate applications for types of motors (linear, servo, AC induction, DC motors, and transformers)
- Select appropriate applications for frequency drives
- Identify motor components

### Mechanism Drives

- Apply principles of mechanisms
- Identify appropriate applications of various gears and drives
- Demonstrate knowledge of appropriate set-up procedures
- Apply principles of mechanics

### Industrial Robotics Systems

- Interpret appropriate industrial robotic functions and applications
- Interpret basic robotic programming, including CADD
- Identify various industrial robotic design features

### Blueprints and Schematics

- Interpret various lines
- Exhibit knowledge of legends
- Interpret blueprint and schematic components
- Interpret title block information
- Demonstrate knowledge of views, angles, and tolerances



## Sample Questions

### **A flow meter measures**

- A. force per unit of area
- B. volume per unit of time
- C. the product of force and area
- D. the product of volume and time

### **The electrical component used for memory logic is the**

- A. control transformer
- B. closed pushbutton
- C. control relay
- D. circuit breaker

### **A body weighing 100 pounds is lifted 10 feet. What is its change in potential energy?**

- A. 10 pounds
- B. 1,000 pounds
- C. 10 foot pounds
- D. 1,000 foot pounds

### **The graphite connectors that ride against the motor commutator are called**

- A. brushes
- B. slip rings
- C. armatures
- D. fields

### **The zero point of a robot is considered the**

- A. first program step
- B. last program step
- C. origin of a coordinate system
- D. point of axis movement

*(Continued on the following page)*

### Sample Questions (continued)

**The operating area around a robot should be free of debris, water, and**

- A. light
- B. oil
- C. heat
- D. electricity

**The actuator size, speed, and \_\_\_\_\_ determine the pump size needed in a hydraulic circuit.**

- A. time
- B. distance
- C. load
- D. maximum pressure

**To reverse rotation on a single-phase capacitor-start motor, one would reverse the leads**

- A. on the capacitor
- B. on the start-winding
- C. at the power supply
- D. on the field winding

**What is the difference between encoders and tachometers?**

- A. Tachometers refer to positions and encoders refer to velocity.
- B. Encoders refer to positions and tachometers refer to velocity.
- C. Tachometers deal with feedback and encoders do not.
- D. Tachometers deal with linear motion and encoders do not.

**One of the basic rules when drawing ladder diagrams is**

- A. load devices are always placed at the left end of the line
- B. only one input device should be shown on each line
- C. only one output device should be shown on each line
- D. input devices are never placed in series

## Performance Assessment

NOCTI performance assessments allow individuals to demonstrate their acquired skills by completing actual jobs using the tools, materials, machines, and equipment related to the technical area.

**Administration Time:** 3 hours

**Number of Jobs:** 4

### Areas Covered:

#### 17% Connect and Operate a Circuit

Participants will safely assemble the pneumatic circuit, test the functionality of automatic code, adjust flow control, and switch to manual mode.

#### 26% Assemble a Multiple Shaft Gear Drive System

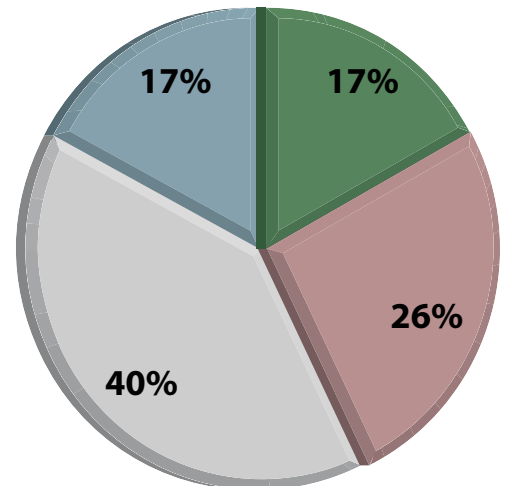
Participants will safely mount and level the motor, install and align flexible coupling, gears, and prony breaks, start and run motor, record motor current, torque down prony breaks, and record motor current rise.

#### 40% Read and Interpret an Industrial Blueprint

Participants will identify materials, surface finish of long taper, surface tolerance of long taper, last revision date, change in last revision, changed dimension tolerance, dimensional width, tolerance of parallel dimension, surface finish of short taper, reason for diagonal lines, part number, surface finish of internal transition, and overall diameter of the part.

#### 17% Troubleshoot an Electrical Control System

Participants will safely determine the malfunction, remove the faulty fuse, replace the fuse, and start and run the motor.





## Sample Job

### Read and Interpret an Industrial Blueprint

**Maximum Time:** 30 minutes

**Participant Activity:** The participant will read the blueprint provided and properly record specifications.

